REPUBLIC OF KENYA

NATIONAL OCCUPATIONAL STANDARDS

FOR

ICT TECHNICIAN

KNQF LEVEL 5

PROGRAMME ISCED CODE: 061 2454A

APPLY BASIC ELECTRONICS

UNIT CODE: 0714 441 04A

UNIT DESCRIPTION

This unit specifies the competencies required to apply basic electronic. It involves identifying electric circuits, identifying electronic components, applying semi-conductor theory, and classifying computer memory, applying logic gates, applying logic gates and performing Boolean algebra operations.

ELEMENTS AND PERFORMANCE CRETIRIA

ELEMENT	PERFORMANCE CRITERIA *(Bold and italicized terms are elaborated in the Range)*
1. Identify electrical circuits	1.1 Electrical circuit are identified as per electrical engineering principles
	1.2 ***Electrical quantities and their S.I units*** are identified as per electrical engineering standards
	1.3 ***Types of electrical circuits*** are identified as per electrical engineering standards
2. Identify electronic components	2.1 Electronic components are Identified as per electrical engineering standard
	2.2 Characteristic of electronic components are identified as per their operations
	2.3 Application of electronic components are Identified as per workplace functions
	2.4 Characteristics of integrated circuit are identified as per the standard mode of operations.
3. Apply Semi-conductor theory	3.1 Explanation of semiconductor theory is done as per the electronics principles.

ELEMENT	PERFORMANCE CRITERIA *(Bold and italicized terms are elaborated in the Range)*
	3.2 Structure of matter is described as per electronics principles
	3.3 Electrons in conductors and semiconductors are explained as per electronics principles
	3.4 Types of semiconductor materials are identified as per electronics principles
	3.5 P-type and N-type materials are explained as per electronics principles
	3.6 Description of P-N junction diodes operations is done as per their operations
	3.7 Types and operations of transistors are identified as per electronics principles
	3.8 Semiconductor theory is applied in electrical circuits as per electronics principles
4. Classify computer memory	4.1 ***Classification of computer memories*** are identified as per their characteristics
	4.2 Memory hierarchy is identified as per memory speed
	4.3 ***Levels of memory storage*** are identified as per technology used.
	4.4 Classification of memories is done as per the technology used
5. Apply logic gates	5.1 Logic gates are identified as per the Digital Electronics principles
	5.2 Logic circuits are developed as per the standard procedures
	5.3 Logic circuits are simplified as per the standard procedures

ELEMENT	PERFORMANCE CRITERIA *(Bold and italicized terms are elaborated in the Range)*
	5.4 Apply logic gates in electronic circuits as per digital Electronics principles
6. Perform Boolean algebra operations	6.1 Key concepts in Boolean algebra are explained as per the digital electronics principles
	6.2 Boolean Expressions are demonstrated as per the SOPs
	6.3 Basic Boolean operations are performed as per the SOPs
	6.4 Methods of simplifying Boolean expressions are illustrated as per the SOPs
	6.5 Boolean Laws and Theorems are illustrated as per the SOPs
	6.6 Simplification rules for Boolean expressions are illustrated as per the SOPs

RANGE

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

Variable	Range *May include but is not limited to:*
1. Electrical quantities and their units	● E.M.F in volts ● Power in watts ● Energy in joules ● Resistance in ohms ● Current in amperes
2. Types of electrical circuits	● AC – Alternating Current

Variable	**Range** ***May include but is not limited to:***
	● DC – Direct Current
3. Types and operations of transistors	● Types ✔ PNP ✔ NPN ● Operations ✔ Forward biasing ✔ Reverse Biasing
4. Types of memories	● Semi-conductor ● Magnetic ● Optical
5. Classification of memories	● RAM ● ROM
6. Levels of memory storage	● Internal ● Main ● Online ● Offline bulk

REQUIRED KNOWLEDGE AND UNDERSTANDING

The individual needs to apply knowledge and understanding of:

- Electrical Components
- Electrical Quantities and units of measurement
- Electrical circuits
- Semiconductor theory

- Types of Computer memories
- Boolean algebra
- Logic gates

FOUNDATION SKILLS

The individual needs to apply the following foundation skills:

- Communications (verbal and written);
- Proficient in ICT
- Time management
- Problem solving
- Decision making
- First aid

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and understanding and range.

1. Critical Aspects of Competency	***Assessment requires evidence that the candidate:*** 1.1 Identified electrical quantities and their S.I units as per electrical engineering standards 1.2 Identified types of electrical circuits as per electrical engineering standards 1.3 Identified electronic components as per electrical engineering standard 1.4 Memory storage as per technology used 1.5 Identified application of electronic components as per work place functions

	1.6 Identified type and operations of transistors as per electronics principles 1.7 Identified logic gates as per the Digital Electronics principles 1.8 Developed logic circuits as per the standard procedures 1.9 Simplified logic circuits as per the standard procedures 1.10 Performed basic Boolean operations as per work procedures
2. Resource Implications	The following resources should be provided: 2.1 Appropriately simulated environment where assessment can take place 2.2 Access to relevant work environment 2.3 Resources relevant to the proposed activities or tasks
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Practical 3.2 Projects 3.3 Third party reports 3.4 Portfolio of evidence evaluation 3.5 Written tests
4. Context of Assessment	This Competency may be assessed individually in a workplace or simulated workplace
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.